

Application No.: 09/837,911

2

Docket No.: 495152000111

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**In the claims:**

Claims 1-109 (Canceled).

110. (Currently Amended): A method for plating a film to a desired thickness on a surface of a substrate, comprising:

providing a plurality of stacked plating modules and a substrate transferring mechanism;  
picking up a substrate from a substrate holder with the substrate transferring mechanism;  
loading the substrate into a first one of the stacked plating modules with the substrate transferring mechanism;

positioning the substrate within a bath in the first one of the stacked plating modules, the bath divided by a first wall and at least a second wall, wherein the first wall is adjacent to a first portion of the substrate and the at least second wall is adjacent to at least a second portion of the substrate when the substrate is positioned within the bath, wherein the first portion and the second portion are portions of the same surface on the substrate; and

plating a film the film to the desired thickness on the first portion of the substrate in the first one of the stacked plating modules; and

after plating the film on the first portion of the substrate, plating the film to the desired thickness on the at least second portion of the substrate in the first one of the stacked plating modules, wherein the second portion is at a different radial location than the first portion.

111. (Previously Presented): The method of claim 110, further comprising:

after plating the film on the substrate, drying the substrate by at least one of spinning the substrate or directing drying gas onto the substrate.

sf-1904531

Application No.: 09/837,911

3

Docket No.: 495152000111

112. (Previously Presented): The method of claim 110, wherein at least a second one of the plurality of plating modules is a cleaning module, the method further comprising:

after plating the film on the substrate, picking up the substrate with the substrate transferring mechanism from the first one of the stacked plating modules;

placing the substrate into the second one of the stacked plating modules for cleaning;

cleaning the substrate in the second one of the stacked plating modules; and

drying the substrate in the second one of the stacked plating modules.

113. (Currently Amended): An automated tool for plating a film on a substrate, the substrate being a semiconductor wafer, comprising:

at least two plating baths positioned in a stacked relationship, wherein each of the at least two plating baths ~~is divided by a first wall and at least a second wall, wherein the first wall is adjacent to a first portion of the substrate and the at least second wall is adjacent to at least a second portion of the substrate when the substrate is positioned within the bath, wherein the first portion and the second portion are portions of the same surface on the substrate~~ wherein each of the at least two plating baths includes a first anode adjacent to the first wall and a second anode adjacent to the at least second wall, wherein the first and second anode are connected to a first power supply and a second power supply, respectively, and wherein the first and second power supplies are configured to alternate in providing power to the first and second anodes, respectively;

at least one substrate holder;

a substrate transferring mechanism;

a frame supporting said plating baths, said substrate holder and said substrate transferring mechanism; and

a control system in communication with said substrate transferring mechanism, substrate holder and said plating baths configured to continuously perform uniform film deposition on the substrate.

sf-1904531

Application No.: 09/837,911

4

Docket No.: 495152000111

114. (Previously Presented): The automated tool of claim 113, further comprising:  
at least two cleaning modules positioned in a stacked relationship with said at least two plating baths.

115. (Previously Presented): The automated tool of claim 113, wherein the substrate transferring mechanism includes a telescoping member movable with three degrees of freedom.

116. (Previously Presented): The automated tool of claim 113, wherein said substrate transferring mechanism is mounted on a bottom portion of said frame.

117. (Previously Presented): The automated tool of claim 113, wherein said substrate transferring mechanism is mounted on a top portion of said frame.

118. (Previously Presented): The automated tool of claim 113, further comprising at least a second set of plating baths positioned in a stacked relationship and at least two additional cleaning modules positioned in a stacked relationship with said second set of plating baths.

119. (Previously Presented): The method of claim 110, wherein plating a film on the substrate comprises:

flowing an electrolyte in a gap formed between the first wall and the first portion of the substrate to plate a film on the first portion of the substrate; and

flowing the electrolyte in a gap formed between the at least second wall and the at least second portion of the substrate to plate a film on the at least second portion of the substrate.

120. (Previously Presented): The method of claim 119, further comprising:  
supplying the electrolyte to the bath using a plumbing box.

sf-1904531

Application No.: 09/837,911

5

Docket No.: 495152000111

121. (Previously Presented): The method of claim 120, wherein the plumbing box includes:

a pump;  
valves;  
filters; and  
plumbing connections.

122. (Previously Presented): The method of claim 119, wherein plating a film on the substrate comprises:

applying a charge to the electrolyte flowing in the gap formed between the first wall and the first portion of the substrate using a first anode adjacent to the first wall; and

applying a charge to the electrolyte flowing in the gap formed between the at least second wall and the at least second portion of the substrate using at least a second anode adjacent to the at least second wall.

123. (Previously Presented): The method of claim 122, wherein the first anode and the at least second anode are connected to a power supply.

124. (Previously Presented): The method of claim 110, wherein plating a film on the substrate comprises:

plating a seed layer on a dielectric layer on the substrate in the first one of the stacked plating modules.

125. (Previously Presented): The method of claim 124, further comprising:

after plating the seed layer on the dielectric layer on the substrate, transferring the substrate into at least a second one of the plurality of plating modules; and

sf-1904531

Application No.: 09/837,911

6

Docket No.: 495152000111

plating a metal film on the seed layer in the at least second one of the plurality of plating modules.

126. (Previously Presented): The method of claim 125, wherein the first one of the stacked plating modules and the at least second one of the plurality of plating modules use different electrolyte or plating hardware.

127. (Previously Presented): The method of claim 110, further comprising:  
rotating the substrate within the bath.

128. (Previously Presented): The method of claim 110, further comprising:  
moving the substrate holder in a vertical direction to match the vertical position of the substrate transferring mechanism.

129. (Previously Presented): The method of claim 110, further comprising:  
moving the substrate transferring mechanism in a horizontal direction.

130-132 (Canceled).

133. (Previously Presented): The automated tool of claim 113, further comprising:  
an electrolyte tank; and  
a plumbing box connected to the electrolyte tank and to the at least two plating baths to supply electrolyte to the at least two plating baths from the electrolyte tank.

134. (Previously Presented): The automated tool of claim 133, wherein the plumbing box includes:

a pump;  
valves;

sf-1904531

Application No.: 09/837,911

7

Docket No.: 495152000111

filters; and

plumbing connections.

135. (Previously Presented): The automated tool of claim 133, wherein the electrolyte flows in a gap formed between the first wall and the first portion of the substrate to plate a film on the first portion of the substrate, and wherein the electrolyte flows in a gap formed between the at least second wall and the at least second portion of the substrate to plate a film on the at least portion of the substrate.

136. (Previously Presented): The automated tool of claim 133, wherein the electrolyte tank includes a temperature control.

137. (Previously Presented): The automated tool of claim 113, further comprising: at least two drivers, wherein a driver rotates or oscillates the substrate over a plating bath.

138. (Previously Presented): The automated tool of claim 113, wherein the at least two plating baths includes:

a first plating bath to plate a seed layer on a dielectric layer on the substrate; and

a second plating bath to plate a metal film on the seed layer, wherein the substrate transferring mechanism transfers the substrate from the first plating bath to the second plating bath after the seed layer is plated on the dielectric layer on the substrate.

139. (Previously Presented): The automated tool of claim 138, wherein the first plating bath and the second plating bath use different electrolyte or plating hardware.

sf-1904531

Application No.: 09/837,911

8

Docket No.: 495152000111

140. (Previously Presented): The automated tool of claim 113, wherein the substrate holder moves in a vertical direction.

141. (Previously Presented): The automated tool of claim 113, wherein the substrate transferring mechanism moves in a horizontal direction.

142. (Currently Amended): A tool for plating a metal film on a substrate, the substrate being a semiconductor wafer, comprising:

a first plating module having:

a bath divided by a first wall and at least a second wall, wherein the first wall is adjacent to a first portion of the substrate and the at least second wall is adjacent to at least a second portion of the substrate when the substrate is positioned within the bath, wherein the first portion and the second portion are portions of the same surface on the substrate;

a first anode adjacent to the first wall;

a second anode adjacent to the at least second wall; and

at least a second plating module positioned in a stacked relationship with the first plating module;

a substrate holder; and

a first power supply connected to the first anode;

a second power supply connected to the second anode, wherein the first and second power supplies are configured to alternate in providing power to the first and second anodes, respectively;

at least a second plating module positioned in a stacked relationship with the first plating module; and

a substrate transferring mechanism that transfers the substrate between the substrate holder, the first plating module, and the at least second plating module.

sf-1904531

Application No.: 09/837,911

9

Docket No.: 495152000111

143. (Previously Presented): The tool of claim 142, wherein the first plating module includes a driver to rotate or oscillate the substrate over the bath.

144. (Previously Presented): The tool of claim 142, wherein the substrate transferring mechanism transfers the substrate into the first plating module to plate a seed layer on a dielectric layer on the substrate, then transfers the substrate into the at least second plating module to plate a metal film layer on the seed layer.

145. (Previously Presented): The tool of claim 144, wherein the first plating module and the at least second plating module use different electrolyte or plating hardware.

146. (Previously Presented): The tool of claim 142, further comprising:

a first cleaning module, wherein the substrate transferring mechanism transfers the substrate from the first plating module or the second plating module to the first cleaning module to clean the substrate.

147. (Previously Presented): The tool of claim 146, wherein the first cleaning module is positioned in a stacked relationship with the first plating module and the at least second plating module.

148. (Previously Presented): The tool of claim 146, further comprising:

at least a second cleaning module positioned in a stacked relationship with the first cleaning module, wherein the first cleaning module and the at least second cleaning module are positioned adjacent to the first plating module and the at least second plating module.

149. (Previously Presented): The tool of claim 148, wherein the substrate transferring mechanism:

transfers a first substrate from the substrate holder to the first plating module to be plated,

sf-1904531



Application No.: 09/837,911

10

Docket No.: 495152000111

transfers a second substrate from the substrate holder to the second plating module to be plated,

after the first substrate is plated, transfers the first substrate from the first plating module to the first cleaning module to be cleaned, and

after the second substrate is cleaned, transfers the second substrate from the second plating module to the second cleaning module to be cleaned.

150. (Previously Presented): The tool of claim 149, wherein the substrate transferring mechanism moves in a vertical direction to move between the first plating module and the at least second plating module.

151. (Previously Presented): The tool of claim 150, wherein the substrate holder moves in a vertical direction to match the vertical position of the substrate transferring mechanism.

152. (Previously Presented): The tool of claim 149, wherein the substrate transferring mechanism moves in a horizontal direction to move between the first plating module and the first cleaning module.

153-155 (Canceled).

156. (Previously Presented): The tool of claim 142, further comprising:

an electrolyte tank; and

a plumbing box connected to the electrolyte tank and to the first plating module to supply electrolyte to the bath from the electrolyte tank.

157. (Previously Presented): The tool of claim 156, wherein the plumbing box includes:

a pump;

valves;

sf-1904531

Application No.: 09/837,911

11

Docket No.: 495152000111

filters; and

plumbing connections.

158. (Previously Presented): The tool of claim 156, wherein the electrolyte flows in a gap formed between the first wall and the first portion of the substrate to plate a film on the first portion of the substrate, and wherein the electrolyte flows in a gap formed between the at least second wall and the at least second portion of the substrate to plate a film on the at least portion of the substrate.

159. (Previously Presented): The tool of claim 156, wherein the electrolyte tank includes a temperature control.

sf-1904531